

H₂Whoa!

EDUCATOR RESOURCE PACKET



DISCOVERY

Center of Idaho



Table of Contents

H2Whoa! Exhibition Overview.....	3
How to Use the Educator Resource Packet.....	4
Key Concepts, Related Exhibits, and Inquiry Questions.....	5
Idaho Science Content Standard Connections.....	7
Water for Thought: Writing and Reflection Prompts.....	7
Copies of H2Whoa! Signage - Exhibits and Kiosks.....	9
Discovery Center of Idaho Field Work Planning Guide.....	12



H2Whoa! Exhibition Overview

H2Whoa! features a dozen unique interactive exhibits designed to keep water science fresh. During a visit to H2Whoa!, your students will engage with interactives and materials that explore how water is precious, scarce, and essential for life. As part of the exhibition, our engaging educators will be leading science demonstrations to excite students' curiosity and showcase water and its fascinating properties. Did you ever wonder which household item uses the most water? Or which animal can survive months without a single drop? Did you know a giant water pump can pump 150,000 gallons of water per second? This one-of-a-kind exhibition is packed with hands-on exhibits and experiences to prompt these questions and more.

How to Use the Educator Resource Packet

H2Whoa! offers a unique opportunity for students to dive (pun intended!) into the world of water, a precious and scarce resource that is essential for life. Our intent is for you to use this resource packet as a starting place for ideas on how to design a meaningful, informative, and fun visit to the Discovery Center that supports learning and discovery in the classroom.

This resource packet first identifies key themes represented throughout the exhibitions' interactive exhibits. These themes may help to shape and define your goals for students' field work while at the Discovery Center. Within each of the key themes, there is a list of related exhibits and suggested inquiry questions to help facilitate students' learning and discovery while at the Center. In the Water for Thought section of the packet, you will find a few suggested writing and reflection prompts to help encourage reflection and dialogue around water issues before, during, or after your students' visit to H2Whoa!. Copies of exhibit signage are included to help provide background information about the main concepts covered at each of the interactive exhibits. There is a list of potential connections between H2Whoa! and the Idaho Science Content Standard to help draw connections between the exhibition and your classroom. Lastly, we have included a field work planning guide to help you set goals and prepare your students for their visit to the Discovery Center.

Key Concepts, Related Exhibits, and Inquiry Questions

1. Life on earth depends on clean, drinkable freshwater.

Clean freshwater is essential for the life and health of all ecological communities. Humans, just like any other living creature, depend on clean, reliable water sources. Before regular sanitation practices were enacted, water-borne diseases created devastating epidemics. In some parts of the world, or after major disasters, these types of outbreaks can occur again.

Keywords & Ideas: *potable water*

Related Exhibits:

Water Up Close, Filters

Inquiry Questions for Students:

1. Can you think of an organism that could be considered both helpful and harmful?
(Water Up Close)
2. Why do you think different sized filters might be important? (Water Filters)
3. If the tubes held water, what could the plastic beads represent? (Water Filters)





2. Human civilization depends on the transportation of water.

Fresh, clean drinkable water is not distributed equally around the world. Since the earliest beginnings of human civilization, finding and transporting water has been of utmost concern. Engineers have refined transport systems from the times of ancient Roman aqueducts to the canals that transport water across the Treasure Valley today. Now we can capture spring water at the source and ship it around the world in plastic bottles, if we desire - or even send it into space, where the lack of liquid water is a central challenge to further exploration beyond Earth.

Keywords & Ideas: *natural resource, transportation, engineering*

Related Exhibits:

Watersheds, Water Distribution, Water Pumps and Troughs, Pipe Play, Water Filters, Water Up Close, Water Pressure

Inquiry Questions for Students:

1. Where have you seen water moving in your neighborhood? (Water Pumps and Troughs)
2. How far can you move water with minimal waste? (Water Pumps and Troughs)
3. Imagine you could see what lies behind the wall or under your feet. What piping do you think you might see? What does it move and where does it go? (Pipe Play)
4. How might water pressure on the top floor of a skyscraper differ from the first floor? (Water Pressure)
5. How else could you reuse water bottles? (Bottled Water)

3. Water is a powerful force of nature.

Winter snows and spring melts can exert extreme forces on our land and infrastructure, and the very weight of water exerts a force on our bodies. Southwestern Idaho's landscape was shaped by an ancient lake and is still changing today due to the force of water. With each storm, the Treasure Valley continues to change as water erodes and sculpts the land, contributing to the complex interaction of geologic processes that are still very much alive and active today.

Keywords & Ideas: *force, erosion, pressure*

Related Exhibits:

Watershed, River Stones, Water Vortex



Inquiry Questions for Students:

1. How can the force of water change the land? (Stacking Stones)
2. How might a large geologic event, like an earthquake, change a watershed? (Watershed)
3. How could a body of water change over time? (Watershed)
4. What would happen if you placed a boat in a vortex? (Water Vortex)

H2Whoa! Science Content Standard Connections

The Idaho Science Content Standards identified below are an overview of some of the science standards addressed through the H2Whoa! exhibition. Please remember, this is just a place to start! There are many additional connections, including those across disciplines and among many fields of science that can be addressed during a visit to the Center.

KINDERGARTEN

LS1-K01, ESS1-K-1, ESS2-K-3

SECOND GRADE

ESS2-2-1, ESS2-2-2

FOURTH GRADE

ESS2-4-1

FIFTH GRADE

ESS2-5-1, ESS2-5-2, ESS3-5-1

MIDDLE SCHOOL (6TH-8TH)

ESS2-MS-2, ESS2-MS-4

HIGH SCHOOL (9TH-12TH)

ESS3-HS-1, ESS2-HS-5

Water for Thought: Writing & Reflection Prompts

The H2Whoa! exhibition features the following water-related quotes from prominent present day and historical figures. Below are a few writing and reflection prompts that you may like to use to encourage reflection and dialogue around water issues before, during, or after your students' visit to the H2Whoa! exhibition.

Featured Quotes

1. "Anyone who can solve the problems of water will be worthy of two Nobel prizes - one for peace and one for science." President John F Kennedy
2. "If there is magic on this planet, it is contained in water." Loren Eiseley



3. "Earth provides enough to satisfy every man's need, but not every man's greed."
Mohandas K Gandhi
4. "When the well's dry, we know the worth of water." Benjamin Franklin
5. "We forget that the water cycle and the life cycle are one." Jacques Cousteau
6. "Water is the driving force of all nature." Leonardo da Vinci
7. "The greatest threat to our planet is the belief that someone else will save it."
Robert Swan

Suggested Writing & Reflection Prompts

1. A quote is a piece of the story pulled from the broader context of a text.
What larger story do you think the speaker was trying to tell?
2. Create your own story by integrating the speaker's quote into your own text.
3. When did the speaker live? What do you know about the historical context of this person's life?
4. How might the historical context of this time period have shaped or affected the speaker's thoughts around water?
5. Who do you imagine was the speaker's audience? What do you think they hoped to achieve through their words and ideas?

Copies of H2Whoa! Signage: Exhibits and Kiosks

BOTTLED WATER

The United States consumes over 50 billion bottles of water each year, yet only about 13% of these bottles are recycled. Drinking from a reusable water container helps to reduce waste, protect the environment and save you money! Cheers to that!

STACKING STONES

Stacked stones, or cairns, are used as navigational markers in many parts of the world. They vary in size and shape. Can you stack the river stones to make your own marker? [See related content on the River Stones kiosk.]

WATER VORTEX

A water vortex forms when water drains, like in a bathtub, or from water pressure. Giant vortices, resulting from the Missoula floods thousands of years ago, carved through solid rock to create much of the landscape in present day Washington and Idaho.

WATER FILTERS

Drinking water, also known as potable water, in the Boise area comes from both an underground water source, called an aquifer, and from the Boise River. All of the water is filtered, making it safe to drink. Water from the Boise River is filtered using a fibrous material inside plastic tubes. The water undergoes further treatment before it finally reaches your home to make certain it's safe for you to drink.

WATER PRESSURE

You have probably experienced water pressure when diving into a pool or lake. The deeper you dive the more pressure you feel. In fact, for every 12 inches you dive, the pressure increases by 0.43 pounds per square inch (psi). The same principle applies to your home. If your water supply is 150 feet above your home, the pressure at your faucet will be over 60 psi! Do you know the water pressure in your home? [See related content on the Water Pressure kiosk.]



WATERSHEDS

Watersheds drain water from surrounding areas to a river, lake, aquifer or similar body of water. Boise's watershed supplies water to the Boise River, the aquifer (underground water) and lakes. Much of the water that starts in our area ends up in locations hundreds of miles away through an intricate canal system.

WATER UP CLOSE

Water is essential for life, and did you know there is also a lot of life in water? Tiny organisms in water help keep ecosystems healthy, but some can be harmful if you drink them. That is why we don't drink from unfiltered water sources, like lakes and streams.

WATER PUMPS AND TROUGHS

Pumps and troughs have been used to move water for hundreds of years. Some of the biggest pumps in existence are used to control water levels during floods, such as in New Orleans, where the largest pumps in the world are housed. These massive pumps can deliver 150,000 gallons of water per second, or the volume of an Olympic-sized swimming pool, every 30 seconds!

PIPE PLAY

A system or network of pipes, also known as piping, is used to transport liquids. A familiar piping system is plumbing, which is used to transport drinking water to your home. Can you connect the different shaped pipes and fittings to build your own piping system?

WATER USE AROUND THE WORLD KIOSK

Countries with large populations typically consume more water than those with smaller populations. Much of the water is used to produce the food and products the country consumes. The United States produces and consumes foods and products that use a lot of water, putting us at the top of the list for water consumption - gulp...

WATER DISTRIBUTION KIOSK

Getting water where we need it is an age-old challenge. Although we have made great advances in water distribution, not everyone is so lucky to turn on a tap to get their water. Developing nations like India, still use simple methods to collect and transport water.

RIVER STONES KIOSK

Have you ever noticed river stones are usually smooth and rounded? Water flowing over the stones helps make them round, then tumbling makes them smoother and ultimately smaller.

BODY OF WATER KIOSK

Over half of your body is made up of water! While we need to drink water every day, some animals can go for long periods without a sip. The Australian Water Holding Frog can survive months without a single drop of water by encasing itself in a watertight cocoon while it waits for the next rainy season.

WATER CONSERVATION KIOSK

The average American uses 100 gallons of fresh water each day. Toilets and bathtubs use the most water in our homes. Here are some ways to reduce the amount of water you use:

- Save 15 gallons of water during a 10 minute shower by making the switch to a low-flow shower head
- Washing dishes by hand typically uses 20 gallons of water, while running a standard dishwasher uses only six
- By repairing leaky faucets or toilets, you can save 10 gallons of water per day

WATER IN SPACE KIOSK

Water on Earth is precious. Water in space is irreplaceable, which is why every drop must be recycled. If you were aboard the International Space Station, you would even drink recycled urine! But don't worry, filters remove everything that isn't pure water, so drink up!

WATER PRESSURE KIOSK

Pumps move water from a source to giant water towers and tanks located on a hill in your city or town. Water exits the tower through a large pipe and into a complex piping system that eventually reaches your home. The closer your home is to sea level, the higher your water pressure will be. Water from towers and tanks act as a reserve and is needed only when demand surpasses what the pumps can supply.



Discovery Center of Idaho Field Work Planning Guide

From “Field Trip” to “Field Work:” Reimagining the Student Experience

Just like scientists, students benefit from spending time in the field making observations, inspiring curiosity, and researching a concept. This planning guide can help identify your goals for your students’ field work at the Center and help your students meet those goals.

STEP ONE: IMAGINE THE POSSIBILITIES

In the boxes below, please describe the learning experience you have imagined for your students. What field work will your students do while they are at the Center? What will your students do before and after your field work to connect learning to your classroom?

BEFORE	DURING	AFTER

STEP TWO: DEFINE YOUR GOALS

What do you hope students will be curious about when they visit the Center? What do you hope students will take away from this experience?

CURIOSITY FACTOR	TAKE-AWAY

STEP THREE: COLLABORATION

Please contact Discovery Center education staff at education@dcidaho.org with any remaining questions or concerns you have about your upcoming field work. We're here to help!